

WHAT IS CLAIMED IS:

- 1           1.       A probe microscope comprising:  
 2                   a probe;  
 3                   a scanner for generating relative motion between said probe and a sample;  
 4                   a manual input device having a substantially unlimited range of  
 5                   mechanical motion to control a separation between the sample and said  
 6 probe, said manual input device having a substantially unlimited range of mechanical  
 7 motion;  
 8                   a detector that generates a probe motion signal related to movement of  
 9 said probe;  
 10                  an alerting device responsive to said signal to provide substantially real-  
 11 time feedback to an operator, the feedback being indicative of interaction between the  
 12 sample and said probe.  
 13
- 1           2.       The probe microscope of Claim 1, wherein said alerting device is a  
 2 mechanical resistance device coupled to said manual input device.  
 3
- 1           3.       The probe microscope of Claim 2, wherein said manual input device is a  
 2 rotatable knob.  
 3
- 1           4.       The probe microscope of Claim 3, wherein said resistance device is a  
 2 passive resistance device that changes an amount of torque necessary to turn the knob.  
 3
- 1           5.       The probe microscope of Claim 4, wherein said passive resistance device  
 2 is a brake.  
 3
- 1           6.       The probe microscope of Claim 4, wherein the amount of torque is related  
 2 to a magnitude of the interaction.  
 3

1           7.       The probe microscope of claim 2, wherein said resistance device is an  
2 active resistance device.

1           8.       The probe microscope of Claim 7, wherein said active resistance device  
2 actively moves said manual input device.

1           9.       The probe microscope of Claim 2, wherein the feedback produced by said  
2 resistance device is variable.

1           10.      The probe microscope of Claim 9, wherein the probe motion signal is  
2 indicative of a tip-sample interaction, and wherein the variable resistance is related to the  
3 interaction.

1           11.      The probe microscope of Claim 1, wherein the feedback produces an  
2 audible output, wherein the audible output is related to a magnitude of the interaction.

1           12.      The probe microscope of Claim 11, wherein the audible output is one of  
2 pitch and volume.

1           13.      The probe microscope of Claim 1, further comprising  
2                   a displacement sensor that measures the relative motion between said  
3 probe and the sample and generates a corresponding position signal; and  
4                   a closed-loop feedback controller that generates a drive signal in response  
5 to the position signal.

1           14.      The probe microscope of Claim 3, wherein said knob has a range of  
2 motion greater than 180°.

1           15.      The probe microscope of Claim 1, wherein the feedback is one of  
2 substantially proportional, exponential and logarithmic with respect to the interaction.

1 16. A method of making a force curve measurement on a sample, the method  
2 comprising:  
3 manually controlling a separation between a probe and the sample;  
4 measuring the separation;  
5 detecting a force on the probe in response to said generating step;  
6 providing an alert based on the force; and  
7 wherein said controlling step includes using a rotatable knob.  
8

1 17. The method of Claim 16, wherein said providing step includes using a  
2 brake to control a torque required to rotate the knob.  
3

1 18. The method of Claim 17, wherein the torque is proportional to the force.  
2

1 19. The method of Claim 16, wherein the knob has a range of motion greater  
2 than 180°.  
3

1 20. The method of Claim 16, further comprising the step of repeating said  
2 controlling step in response to at least of one said measuring and detecting steps.  
3

1 21. The method of Claim 16, wherein the alert is an audio alert.  
2

1 22. A probe microscope including a probe that interacts with a sample, the  
2 microscope comprising:  
3 a manual rotary input knob that modulates a separation between the probe  
4 and the sample, said knob having a range of motion greater than 180°;  
5 an alerting device responsive to interaction between the probe and the  
6 sample so as to provide feedback to the operator, the feedback being indicative of a  
7 magnitude of the interaction.  
8

1 23. The probe microscope of Claim 22, wherein said alerting device is a  
2 brake.

1           24.    The probe microscope of Claim 23, wherein said brake is a passive  
2 resistance device that changes a torque required to rotate the knob.

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1           25.    A probe microscope comprising:  
2                   a probe;  
3                   a scanner for generating relative motion between said probe and a sample;  
4                   a linear manual input device to control a separation between the sample  
5 and said probe;  
6                   a detector that generates a probe motion signal related to movement of  
7 said probe;  
8                   an alerting device responsive to said signal to provide substantially real-  
9 time feedback to an operator, the feedback being indicative of interaction between the  
10 sample and said probe.